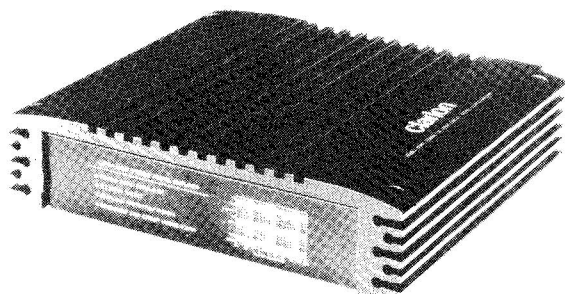


# clarion Service Manual

Published by Service Administration Section



## 140W + 140W(PEAK) DC SERVO STEREO POWER AMPLIFIER

Model **1002HA (EE-713A)**

### ■ SPECIFICATIONS:

|                      |   |
|----------------------|---|
| Circuit system       | : W-servo regulator<br>PWM±2 power units<br>Parallel push-pull complementary circuit<br>Current mirror load circuit<br>DC servo circuit |
| Rated power          | : 80W+80W (1 kHz, 0.1 %, 4Ω)  |
| Max. power           | : 140W+140W (Peak)  |
| Load impedance       | : 4Ω × 2  |
| Power supply voltage | :<br>DC 14.4V (10.8 to 15.6V)<br>Negative ground  |
| Current consumption  | :<br>20A (at rated power)   |
| Dimensions           | : Width 245 mm<br>Height 62 mm<br>Depth 250 mm  |
| Weight               | : 3.8 kg  |

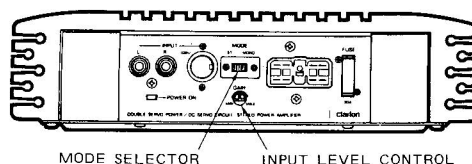
### ■ COMPONENTS:

|                               |             |   |
|-------------------------------|-------------|---|
| ● EE-713A-01                  |             |   |
| Main unit                     |             | 1 |
| Parts bag                     | 653-0086-39 | 1 |
| Lead holder                   | 335-0833-01 | 5 |
| Tap-screw                     | 653-0086-48 | 6 |
| Plate nut                     | 653-0086-49 | 4 |
| DIN cable                     | 653-0088-04 | 1 |
| Extension lead (Power supply) | 852-7219-05 | 1 |
| 9 P connector                 | 653-0088-03 | 1 |

### ■ FEATURES:

- Total Maximum Power Output 140W+140W (PEAK)
- EIAJ Max. Output Power 100W+100W (@ 1kHz, 10% THD)
- Continuous Output Power 160W (80W/ch. into 4 Ohm, 20Hz to 20kHz, @ 0.1% THD)
- Bridge (MONO) Capability (Max. 200W @ 10% THD)
- DC Servo Circuit
- Double Servo Regulator Power Supply Circuit
- Isolated Input Ground Circuit
- Adjustable Input Level Control
- 10Hz to 60kHz (-1dB) Frequency Response
- Overvoltage Protection System
- Overheating Protection Circuit
- Speaker Lead Short Protection Circuit
- Turn ON Muting Circuit (Soft Start)
- Automatic Remote Switching Circuit

### ■ OPERATION:

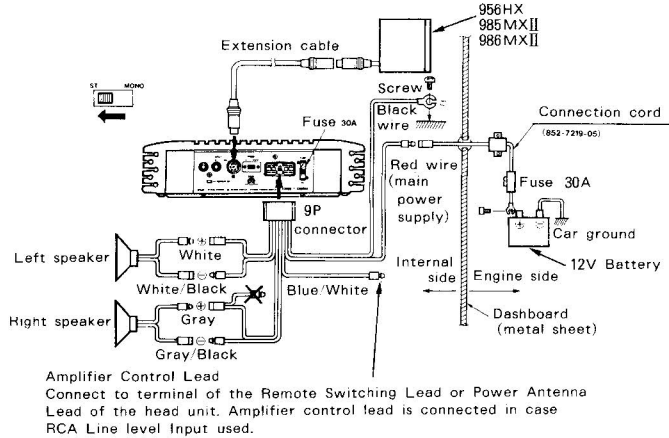


- **MODE SELECTOR** : Set the mode selector to the desired mode.  
**MODE SELECTOR (MONO)** : To use the amp for monaural reproduction only, remove the two screws, turn the plate 180° and fasten the plate using the two screws.
- **INPUT LEVEL CONTROL** : Adjust the input level control to obtain desired gain.

## WIRE CONNECTION:

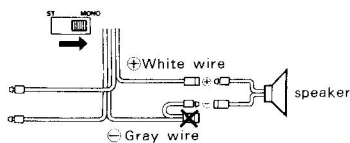
### STEREO MODE

- The mode selector must be switched to the stereo mode.



### MONO (BRIDGE) MODE

- The mode selector must be switched to the mono (bridge) mode.



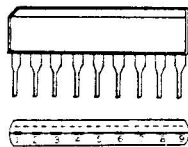
- Note: 1) The head wires marked "X" are not used. Make sure that they are not in contact with metal.
- 2) When not using the DIN cord, Input to the RCA terminal. In this case, connect the amplifier control lead (blue/white) in the 9 pin connector to the external power lead from the unit. When using the RCA terminal in mono, only connect the left channel.
- 3) Use 4 ohms impedance speakers with maximum wattage rating of more than 100 watts (mono mode: 200 watts)

## EXPLANATION OF IC's:

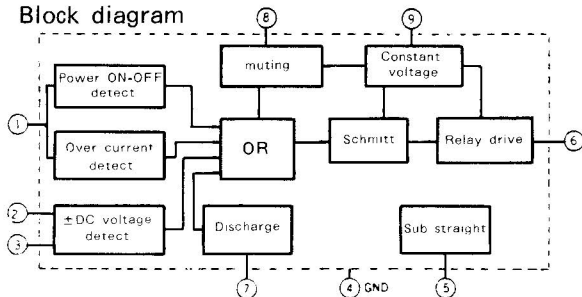
### TA 7317P 051-0247-00 OCL

Power Amp. & Speaker protection circuit

Outward Form



Block diagram

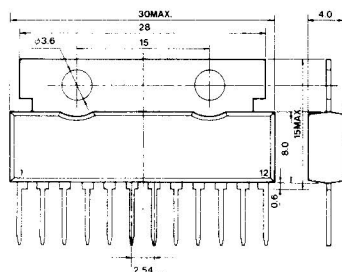


### μPC1225H 653-0086-50 30 ~ 50W

Power amp • driver

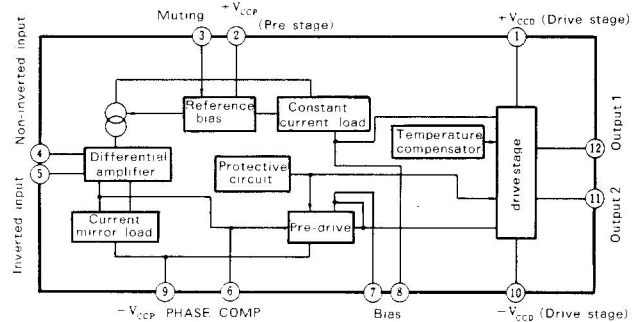
This IC is a stereo Hi-Fi power amplifier driver. It consists of a Voltage amplifier circuit, pre-drive circuit, drive circuit, and protective circuit.

Outward Form



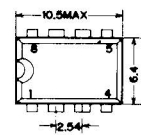
Terminal Description

| 端子No. | 接 続                                       |
|-------|---|
| 1     | +V <sub>CCD</sub> (Drive stage power)     |
| 2     | +V <sub>CCP</sub> (Pre-drive stage power) |
| 3     | MUTING                                    |
| 4     | INPUT                                     |
| 5     | NFB                                       |
| 6     | PHASE COMP                                |
| 7     | BIAS                                      |
| 8     | BIAS                                      |
| 9     | -V <sub>CCP</sub> (Pre-drive stage power) |
| 10    | -V <sub>CCD</sub> (Drive stage power)     |
| 11    | LOWER OUTPUT                              |
| 12    | UPPER OUTPUT                              |

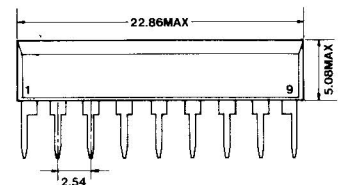


- μPC4570C 659-0247-15 Super low noise,
- μPC4570HA 653-0086-58 High speed, wide-band Dual OP. Amp.

Outward Form



μPC4570C

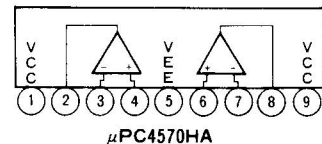


μPC4570HA

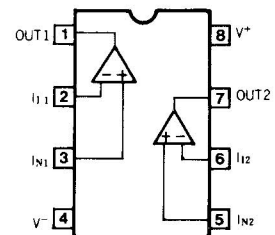
Feature

- Phase compensation
- Noise voltage referred to input ( $f=1\text{kHz}$ )  $4.5\text{nV}/\sqrt{\text{Hz}}$
- T.H.D ( $f=20\text{Hz} \sim 20\text{kHz}$ ) 0.002%
- Slew rate  $7\text{V}/\mu\text{s}$

Block Diagram



μPC4570HA

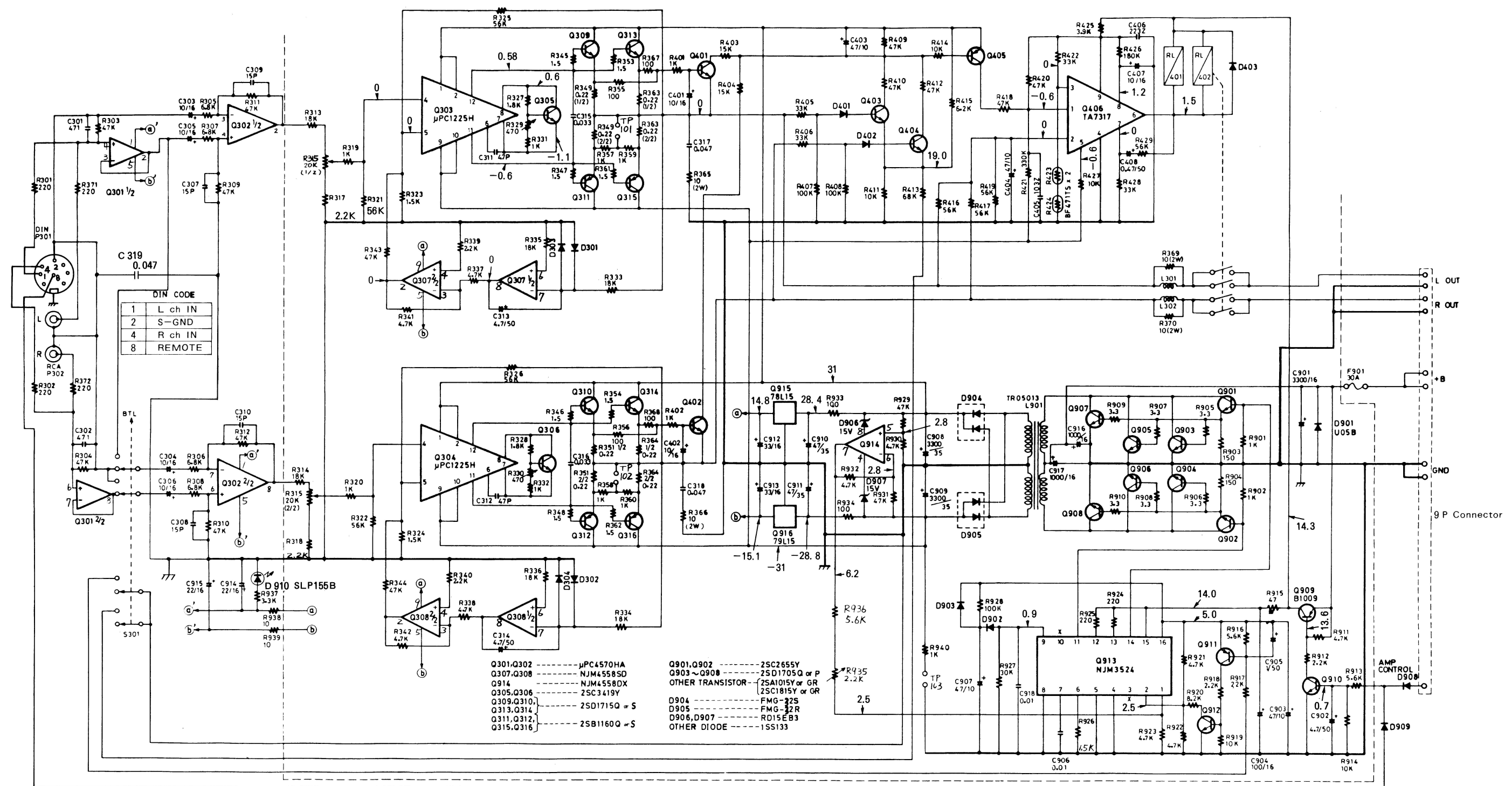


μPC4570C

### ■ NJM 3524 051-0749-00 PWM Switching Regulator Controller

Refer to the description in Explanation of ICS Vol. 2.  
(Page 50)

■ **CIRCUIT DIAGRAM:**



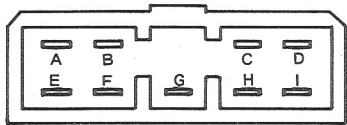
\* The voltages are as measured with a digital voltmeter without stereo signals. ( DCV )

Note : Remember that the heat sink for  $\mu$ PC 1225H is expressed in  $-V_{CC}$ .

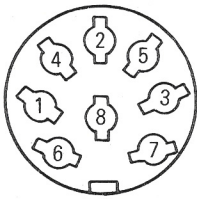


## ■ PRINTED WIRING BOARD:

|   |                 |
|---|-----------------|
| A | LEFT SPEAKER ⊕  |
| B | RIGHT SPEAKER ⊕ |
| C | GND             |
| D | ACC             |
| E | LEFT SPEAKER ⊖  |
| F | RIGHT SPEAKER ⊖ |
| G | AMP CONTROL +B  |
| H | GND             |
| I | ACC             |



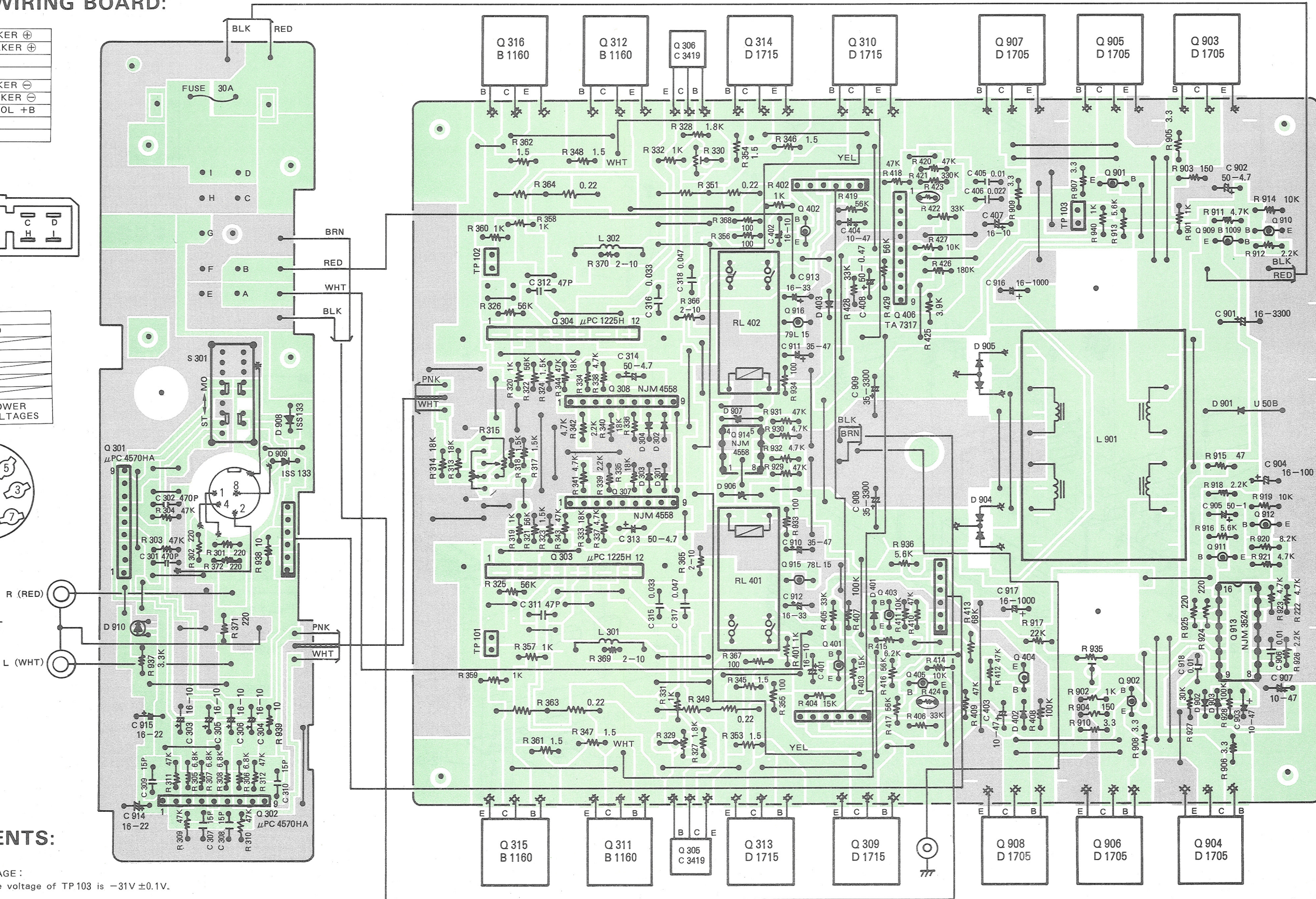
|   |                                 |
|---|---------------------------------|
| 1 | L ch INPUT                      |
| 2 | SIGNAL GND                      |
| 3 |                                 |
| 4 | R ch INPUT                      |
| 5 |                                 |
| 6 |                                 |
| 7 |                                 |
| 8 | REMOTE POWER<br>ON-OFF VOLTAGES |



L (WHT)

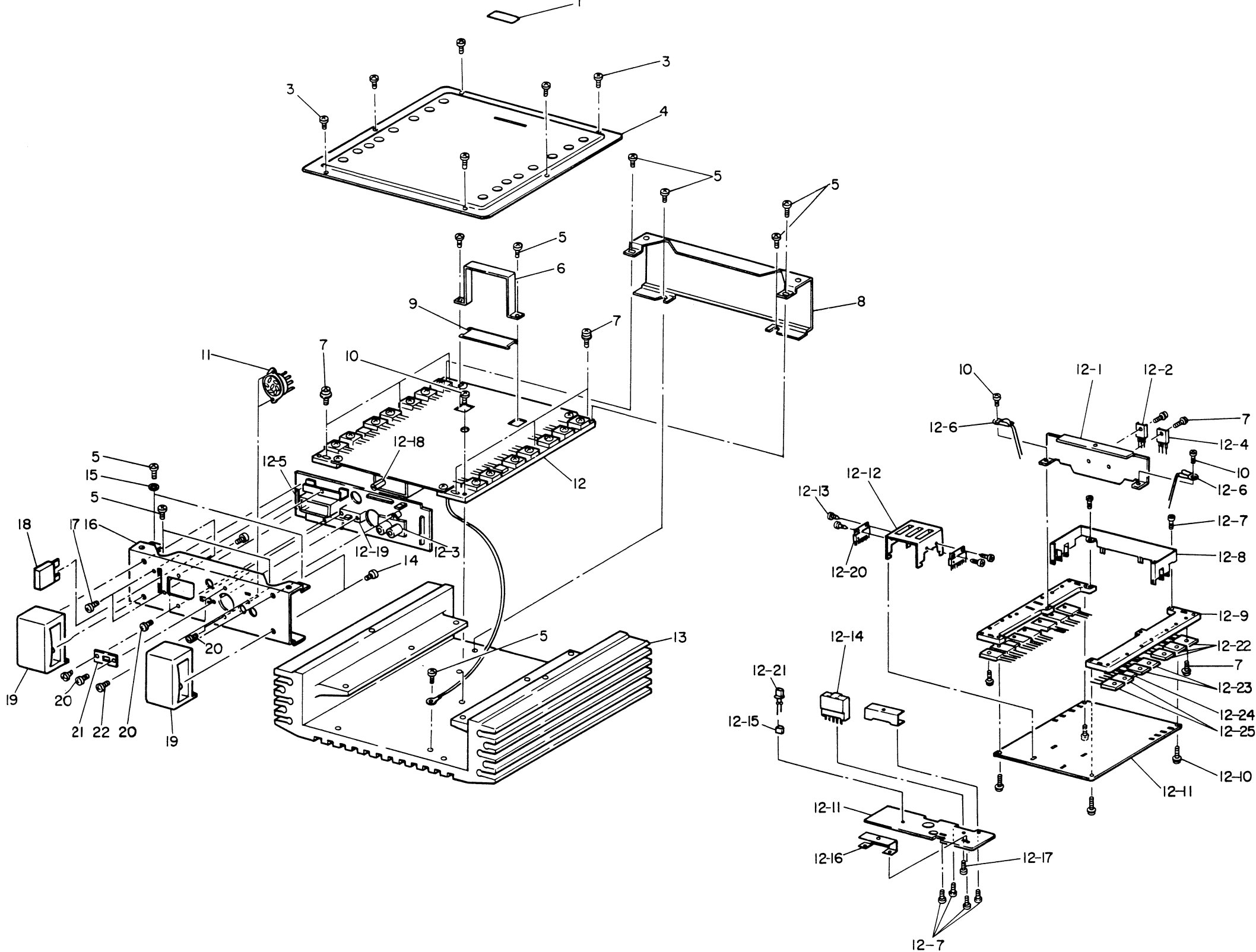
## ADJUSTMENTS:

1. POWER SUPPLY VOLTAGE :  
Adjust R 935 so that the voltage of TP 103 is  $-31V \pm 0.1V$ .
2. IDLING CURRENT  
Before making adjustments, preheat under the following conditions:  
Time : 15 minutes  
Voltage : 14.4V  
Input signal : No signal (Input shorted)  
Output load : None  
  
Adjust R 329 (L) so that the voltage of TP 101 is  $4.4mV \pm 0.5mV$ .  
Adjust R 330 (R) so that the voltage of TP 102 is  $4.4mV \pm 0.5mV$ .





EXPLODED VIEW · PARTS LIST:



| REF. NO. | PART NO.    | DESCRIPTION                     | Q'TY |
|----------|-------------|---------------------------------|------|
| 1        | 286-6968-00 | Set plate                       | 1    |
| 3        | 653-0086-03 | B-tight $\phi 3 \times 6$ (BLK) | 6    |
| 4        | 653-0086-04 | Lower case                      | 1    |
| 5        | 653-0086-05 | B-tight $\phi 3 \times 6$       | 11   |
| 6        | 653-0086-06 | MTG BRACKET (TRANS)             | 1    |
| 7        | 653-0086-07 | Double sems M 3×12              | 24   |
| 8        | 653-0086-08 | Face panel                      | 1    |
| 9        | 653-0086-09 | Insulator plate                 | 1    |
| 10       | 653-0086-10 | B-tight $\phi 3 \times 8$       | 3    |
| 11       | 653-0088-01 | DIN SOCKET                      | 1    |
| 12       | -           | AMP ASSY                        | 1    |
| 12-1     | 653-0086-22 | Heat sink                       | 1    |

| REF. NO. | PART NO.    | DESCRIPTION               | Q'TY |
|----------|-------------|---------------------------|------|
| 12-2     | 653-0086-23 | Diode (FMG 32S)           | 1    |
| 12-3     | 653-0086-24 | Pin jack                  | 1    |
| 12-4     | 653-0086-25 | Diode (FMG 32R)           | 1    |
| 12-5     | 653-0086-26 | AUTO FUSE holder          | 1    |
| 12-6     | 653-0086-27 | Posister                  | 2    |
| 12-7     | 653-0086-28 | B-tight $\phi 3 \times 6$ | 6    |
| 12-8     | 653-0086-29 | Earth bar                 | 1    |
| 12-9     | 653-0086-30 | Heat sink                 | 2    |
| 12-10    | 653-0086-31 | B-tight $\phi 3 \times 8$ | 4    |
| 12-11    | 653-0086-32 | PCB                       | 1    |
| 12-12    | 653-0086-33 | Heat sink                 | 1    |
| 12-13    | 653-0086-34 | Screw M 3×6               | 4    |

| REF. NO. | PART NO.    | DESCRIPTION               | Q'TY |
|----------|-------------|---------------------------|------|
| 12-14    | 653-0086-35 | Connector                 | 1    |
| 12-15    | 653-0086-36 | LED holder                | 1    |
| 12-16    | 653-0086-37 | Connector bracket         | 2    |
| 12-17    | 653-0086-38 | P-tight $\phi 3 \times 8$ | 1    |
| 12-18    | 653-0086-62 | Variable resistor         | 1    |
| 12-19    | 653-0086-67 | Slide switch              | 1    |
| 12-20    | 653-0086-50 | IC ( $\mu$ PC 1225H)      | 2    |
| 12-21    | 653-0086-59 | LED                       | 1    |
| 12-22    | 653-0086-54 | Transistor (2SD 1705)     | 6    |
| 12-23    | 653-0086-52 | Transistor (2SD 1715)     | 4    |
| 12-24    | 102-3419-25 | Transistor (2SC 3419Y)    | 2    |
| 12-25    | 653-0086-53 | Transistor (2SB 1160)     | 4    |

| REF. NO. | PART NO.    | DESCRIPTION                     | Q'TY |
|----------|-------------|---------------------------------|------|
| 13       | 653-0086-13 | Heat sink                       | 1    |
| 14       | 653-0086-14 | Screw M 4×6 (BLK)               | 4    |
| 15       | 653-0086-15 | WASHER $\phi 3$                 | 2    |
| 16       | 653-0088-02 | Escutcheon                      | 1    |
| 17       | 653-0086-17 | P-tight $\phi 2 \times 6$ (BLK) | 2    |
| 18       | 060-0057-10 | Auto fuse (30A)                 | 1    |
| 19       | 653-0086-18 | Handle                          | 2    |
| 20       | 653-0086-19 | Screw M 2.6×5 (BLK)             | 6    |
| 21       | 653-0086-20 | Lock plate                      | 1    |
| 22       | 653-0086-21 | P-tight $\phi 3 \times 8$ (BLK) | 1    |

PARTS LIST: © Electrical Section

| REF. NO.                               | PART NO.    | DESCRIPTION                               | Q'TY |
|--|-------------|---|------|
| Q 301, 302                             | 653-0086-58 | IC ( $\mu$ PC 4570HA)                     | 2    |
| Q 303, 304                             | 653-0086-50 | IC ( $\mu$ PC 1225H)                      | 2    |
| Q 305, 306                             | 102-3419-25 | Transistor (2SC 3419Y)                    | 2    |
| Q 307, 308                             | 653-0086-51 | IC (NJM 4558SD)                           | 2    |
| Q 309, 310, 313, 314                   | 653-0086-52 | Transistor (2SD 1715Q, S)                 | 4    |
| Q 311, 312, 315, 316                   | 653-0086-53 | Transistor (2SB 1160Q)                    | 4    |
| Q 401, 402, 403, 404, 910, 912         | 102-1815-51 | Transistor (2SC 1815GR)                   | 6    |
| Q 405, 911                             | 100-1015-25 | Transistor (2SA 1015Y)                    | 2    |
| Q 406                                  | 051-0247-00 | IC (TA 7317P)                             | 1    |
| Q 901, 902                             | 102-2655-25 | Transistor (2SC 2655Y)                    | 2    |
| Q 903, 904, 905, 906, 907, 908         | 653-0086-54 | Transistor (2SD 1705Q, P)                 | 6    |
| Q 909                                  | 653-0086-55 | Transistor (2SB 1009R)                    | 1    |
| Q 913                                  | 051-0749-00 | IC (NJM 3524D)                            | 1    |
| Q 914                                  | 653-0086-57 | IC (NJM 4558DX)                           | 1    |
| Q 915                                  | 653-0086-68 | IC (78L 15)                               | 1    |
| Q 916                                  | 653-0086-69 | IC (79L 15)                               | 1    |
| D 301~304, 401~403, 902, 903, 908, 909 | 001-0294-00 | Diode (1SS 133)                           | 11   |
| D 901                                  | 001-0100-00 | Diode (U 05B)                             | 1    |
| D 904                                  | 653-0086-23 | Diode (FMG-32S)                           | 1    |
| D 905                                  | 653-0086-25 | Diode (FMG-32R)                           | 1    |
| D 906, 907                             | 001-0323-58 | Diode (RD15EB 3)                          | 1    |
| D 910                                  | 653-0086-59 | LED (SLP-155B)                            | 1    |
| L 301, 302                             | 653-0086-60 | Coil                                      | 2    |
| L 901                                  | 653-0086-61 | DC-DC coil                                | 1    |
| C 311, 312                             | 174-4700-46 | Ceramic capacitor (47pF SL)               | 2    |
| C 313, 314, 902                        | 179-4753-62 | Electrolytic capacitor (50V 4.7 $\mu$ F)  | 3    |
| C 315, 316                             | 173-3331-10 | Polyester capacitor (50V 0.033 $\mu$ F)   | 2    |
| C 317, 318                             | 173-4731-10 | Polyester capacitor (50V 0.047 $\mu$ F)   | 2    |
| C 906, 918                             | 173-1031-10 | Polyester capacitor (50V 0.01 $\mu$ F)    | 2    |
| C 401, 402, 407                        | 179-1063-32 | Electrolytic capacitor (16V 10 $\mu$ F)   | 3    |
| C 403, 404, 903, 907                   | 179-4763-22 | Electrolytic capacitor (10V 47 $\mu$ F)   | 4    |
| C 408                                  | 179-4743-62 | Electrolytic capacitor (50V 0.47 $\mu$ F) | 1    |
| C 904                                  | 179-1073-32 | Electrolytic capacitor (16V 100 $\mu$ F)  | 1    |
| C 905                                  | 179-1053-62 | Electrolytic capacitor (50V 1 $\mu$ F)    | 1    |
| C 910, 911                             | 179-4763-52 | Electrolytic capacitor (35V 47 $\mu$ F)   | 2    |
| C 912, 913                             | 179-3363-32 | Electrolytic capacitor (16V 33 $\mu$ F)   | 2    |
| C 916, 917                             | 179-1083-33 | Electrolytic capacitor (16V 1000 $\mu$ F) | 2    |
| C 307~310                              | 174-1500-46 | Ceramic capacitor (15pF SL)               | 4    |
| C 405                                  | 160-1035-06 | Ceramic capacitor (0.01 $\mu$ F)          | 1    |
| C 406                                  | 160-2235-06 | Ceramic capacitor (0.022 $\mu$ F)         | 1    |
| C 301, 302                             | 160-4712-05 | Ceramic capacitor (470pF)                 | 2    |
| C 914, 915                             | 182-2263-32 | Electrolytic capacitor (16V 22 $\mu$ F)   | 2    |
| C 303~306                              | 182-1063-32 | Electrolytic capacitor (16V 10 $\mu$ F)   | 4    |
| C 901                                  | 653-0086-70 | Electrolytic capacitor (16V 3300 $\mu$ F) | 1    |
| C 908, 909                             | 653-0086-71 | Electrolytic capacitor (35V 3300 $\mu$ F) | 2    |
| R 423, 424                             | 653-0086-27 | Posister                                  | 2    |
| RL 401, 402                            | 653-0086-66 | Relay                                     | 2    |
| R 315                                  | 653-0086-62 | Variable resistor                         | 1    |
| R 329, 330                             | 653-0086-63 | Variable resistor                         | 2    |
| R 935                                  | 653-0086-65 | Variable resistor                         | 1    |
| R 349, 351, 363, 364                   | 653-0086-64 | Cement resistor (5W 0.22 $\times 2$ )     | 4    |
| R 365, 366, 369, 370                   | 114-1001-21 | Metalize resistor (2W 10 $\Omega$ )       | 4    |